

CLAIMS

1 1. A method for controlling the end point of the chemical mechanical polishing (CMP) of a
2 surface having a plurality of projecting components fabricated thereon, comprising the steps of:
3 fabricating a plurality of upwardly projecting components upon a substrate surface;
4 fabricating a CMP polishing end stop layer above said components;
5 fabricating a polishable layer above said stop layer;
6 conducting a CMP polishing step utilizing a polishing slurry that selectively removes said
7 polishing layer as compared to said stop layer;
8 removing portions of said stop layer subsequent to said polishing step.

1 2. A method for controlling CMP polishing as described in claim 1 wherein said stop layer
2 is composed of a substance that is significantly more resistant to polishing removal by said slurry
3 than said polishable layer.

1 3. A method for controlling CMP polishing as described in claim 2 wherein portions of said
2 stop layer are deposited upon a top surface of said projecting components.

1 4. A method for controlling CMP polishing as described in claim 2 wherein said stop layer
2 is deposited upon a top surface of a first material layer that is deposited in part upon a top surface
3 of said projecting components and in part upon a top surface of said substrate.

1 5. A method for controlling CMP polishing as described in claim 2 wherein said stop layer
2 is comprised of a substance selected from the group consisting of tantalum and diamond-like-
3 carbon (DLC).

1 6. A method for controlling CMP polishing as described in claim 5 wherein said stop layer
2 is formed with a thickness of from 200 to 500 Å.

1 7. A method for controlling CMP polishing as described in claim 5 wherein said stop layer
2 is comprised of tantalum and is formed with a thickness of approximately 500 Å.

1 8. A method for controlling CMP polishing as described in claim 5 wherein said stop layer
2 is comprised of DLC and is formed with a thickness of approximately 200 Å.

1 9. A method for controlling CMP polishing as described in claim 2 wherein said stop layer
2 is removed utilizing an ion etching process.

1 10. A method for controlling CMP polishing as described in claim 2 wherein said stop layer
2 is comprised of tantalum and wherein said stop layer is removed utilizing an argon ion etching
3 process.

1 11. A method for controlling CMP polishing as described in claim 2 wherein said stop layer
2 is removed utilizing a CMP process.

1 12. A method for controlling CMP polishing as described in claim 2 wherein said stop layer
2 is comprised of DLC and wherein said stop layer is removed through use of a reactive ion etch
3 process utilizing oxygen reactive species.

1 13. A method for controlling CMP polishing as described in claim 2 wherein said stop layer
2 is comprised of DLC and wherein said stop layer is removed by use of a plasma ashing process
3 utilizing oxygen.

1 14. A method for controlling CMP polishing as described in claim 2 wherein an end stopping
2 point of said CMP process is determined by monitoring a polishing motor current during said
3 CMP polishing step.

1 15. A method for controlling the end point of a chemical mechanical polishing (CMP)
2 process of a surface having a plurality of upwardly projected components fabricated thereon,
3 comprising the steps of:

4 depositing a polishing stop layer upon said components, with portions of said stop layer
5 being deposited upon the top surface portions of said components;
6 depositing a polishable layer upon said stop layer;
7 conducting a CMP polishing step utilizing a polishing slurry that selectively removes said
8 polishing layer as compared to said stop layer; wherein said CMP polishing step is conducted
9 down to said portions of said stop layer that cover said top surface portions of said components;
10 removing said portions of said stop layer that cover said top surface portions of said
11 components.

1 16. A method for controlling CMP polishing as described in claim 15 wherein said polishable
2 layer is deposited to a depth that is greater than the projecting height of said components.

1 17. A method for controlling CMP polishing as described in claim 16 wherein said stop layer
2 is comprised of a substance selected from the group consisting of tantalum and diamond-like-
3 carbon (DLC).

1 18. A method for controlling CMP polishing as described in claim 17 wherein said stop layer
2 is formed with a thickness of from 200 to 500 Å.

1 19. A method for controlling CMP polishing as described in claim 17 wherein said stop layer
2 is comprised of tantalum and is formed with a thickness of approximately 500 Å.

1 20. A method for controlling CMP polishing as described in claim 17 wherein said stop layer
2 is comprised of DLC and is formed with a thickness of approximately 200 Å.

1 21. A method for controlling CMP polishing as described in claim 17 wherein said stop layer
2 is removed utilizing an ion etching process.

1 22. A method for controlling CMP polishing as described in claim 16 wherein said stop layer
2 is comprised of tantalum and wherein said stop layer is removed utilizing an argon ion etching
3 process.

1 23. A method for controlling CMP polishing as described in claim 16 wherein said stop layer
2 is removed utilizing a CMP process.

1 24. A method for controlling CMP polishing as described in claim 17 wherein said stop layer
2 is comprised of DLC and wherein said stop layer is removed through use of a reactive ion etch
3 process utilizing oxygen reactive species.

1 25. A method for controlling CMP polishing as described in claim 17 wherein said stop layer
2 is comprised of DLC and wherein said stop layer is removed by use of a plasma ashing process
3 utilizing oxygen.

1 26. A method for controlling CMP polishing as described in claim 16 wherein an end
2 stopping point of said CMP process is determined by monitoring a polishing motor current
3 during said CMP polishing step.

1 27. A method for controlling the end point of a chemical mechanical polishing (CMP)
2 process of a substrate surface having a plurality of upwardly projecting components fabricated
3 thereon, comprising the steps of:

4 depositing a first layer of material upon said substrate, wherein a projecting portion of
5 said first layer of material is deposited on top of said components;

6 depositing a polishing stop layer upon said first layer of material, with a portion of said
7 stop layer being deposited on top of said projecting portions of said first layer;

8 depositing a polishable layer on top of said stop layer, wherein portions of said polishable
9 layer are deposited on top of said portion of said stop layer that are deposited on top of said
10 projecting portions of said first layer;

11 removing portions of said polishable layer and said stop layer that are deposited on top of
12 said projecting portions of said first layer;

13 conducting a CMP polishing step utilizing a polishing slurry that selectively removes said
14 polishable layer as compared to said stop layer;

15 removing said stop layer from said first layer.

1 28. A method for controlling CMP polishing as described in claim 27 wherein said first layer
2 is deposited to a depth that is less than the projecting height of said components.

1 29. A method for controlling CMP polishing as described in claim 28 wherein said stop layer
2 is comprised of a substance selected from the group consisting of tantalum and diamond like
3 carbon (DLC).

1 30. A method for controlling CMP polishing as described in claim 28 wherein said stop layer
2 is formed with a thickness of from 200 to 500 Å.

1 31. A method for controlling CMP polishing as described in claim 28 wherein said stop layer
2 is comprised of tantalum and is formed with a thickness of approximately 500 Å.

1 32. A method for controlling CMP polishing as described in claim 29 wherein said stop layer
2 is comprised of DLC and is formed with a thickness of approximately 200 Å.

1 33. A method for controlling CMP polishing as described in claim 28 wherein said stop layer
2 is removed utilizing an ion etching process.

1 34. A method for controlling CMP polishing as described in claim 28 wherein said stop layer
2 is comprised of tantalum and wherein said stop layer is removed utilizing an argon ion etching
3 process.

1 35. A method for controlling CMP polishing as described in claim 28 wherein said stop layer
2 is removed utilizing a CMP process including.

1 36. A method for controlling CMP polishing as described in claim 29 wherein said stop layer
2 is comprised of DLC and wherein said stop layer is removed through use of a reactive ion etch
3 process utilizing oxygen reactive species.

1 37. A method for controlling CMP polishing as described in claim 29 wherein said stop layer
2 is comprised of DLC and wherein said stop layer is removed by use of a plasma ashing process
3 utilizing oxygen.

1 38. A method for controlling CMP polishing as described in claim 28 wherein an end
2 stopping point of said CMP process is determined by monitoring a polishing motor current
3 during said CMP polishing step.